

CLAIMS

Therefore, having thus described the invention, at least the following is claimed:

1 1. A container for storing or transporting spent nuclear fuel, the container
2 comprising:
3 a plurality of elongated tubes that receives spent nuclear fuel assemblies, each
4 tube having four sidewalls and four corners defining a rectangular cross section, the
5 plurality of tubes being arranged in an alternating pattern; and
6 an attachment means that attaches together the plurality of tubes at the corners so
7 that two adjacent sidewalls of adjacent tubes are substantially aligned.

1 2. The container as defined in claim 1, wherein the attachment means comprises a
2 plurality of first rods, a plurality of recesses being formed at the corners of the plurality of
3 elongated tubes, the plurality of first rods being mounted in the plurality of recesses of
4 one of the adjacent tubes and engaged to the plurality of recesses of the other adjacent
5 tube when the two adjacent sidewalls of the adjacent tubes are substantially aligned.

1 3. The container as defined in claim 2, wherein the first rods have openings and the
2 attachment mechanism further comprises at least one pin, the plurality of first rods being
3 mounted in the plurality of recesses of one of the adjacent tube and to the plurality of
4 recesses of the other adjacent tube, the first rods of the adjacent tubes being positioned to
5 axially align the openings to insert the pin through the axially aligned openings of the first
6 rods.

1 4. The container as defined in claim 2, further comprising one or more second rods
2 being mounted in the plurality of recesses of one of the adjacent tubes and engaging the
3 plurality of recesses of the other adjacent tube when the two adjacent sidewalls of the
4 adjacent tubes are substantially aligned.

1 5. The container as defined in claim 4, further comprising a first set of tubes that is
2 mounted with the second rods and a second set of tubes that is not mounted with the
3 second rods, the second rods of the first set of tubes engaging the second set of tubes
4 when the two adjacent sidewalls of the adjacent tubes are substantially aligned.

1 6. The container as defined in claim 1, wherein the plurality of elongated tubes is
2 arranged in the alternating pattern such that the placement of a four-tube array linked at
3 the corners of the tubes creates a developed cell.

1 7. The container as defined in claim 1, wherein the plurality of tubes includes a
2 plurality of flat bearing surfaces at the corners of the tubes, the plurality of flat bearing
3 surfaces of the adjacent tubes engaging each other when the two adjacent sidewalls of the
4 adjacent tubes are substantially aligned.

1 8. A container for storing or transporting spent nuclear fuel, the container
2 comprising:
3 a plurality of tubes that receives spent nuclear rods;
4 a plurality of first rods being mounted on the plurality of tubes, said first rods
5 having openings; and
6 one or more pins,
7 wherein the plurality of first rods is aligned so that the one or more pins extend
8 through the openings of the plurality of first rods linking the tubes together.

1 9. The container as defined in claim 8, wherein the one or more pins are welded to or
2 otherwise captured by one of the first rods of the adjacent tubes.

1 10. The container as defined in claim 8, wherein the one or more pins comprise a head
2 portion and a body portion, the body portion extending through the openings of the
3 aligned first rods of adjacent tubes and the head portion being adjacent to one of the
4 plurality of first rods coupled together.

1 11. The container as defined in claim 8, wherein each of the plurality of tubes
2 includes a plurality of recesses on the plurality of tubes, the first rods being mounted in
3 the recesses of one of the adjacent tube and engaging the recesses of the other adjacent
4 tube when the tubes are linked together.

1 12. The container as defined in claim 11, further comprising one or more second rods
2 being mounted in the recesses of one of the adjacent tubes and engaging the recesses of
3 the other adjacent tube when the tubes are linked together.

1 13. The container as defined in claim 12, further comprising a first set of tubes that is
2 mounted with second rods and a second set of tubes that is not mounted with the second
3 rods, the second rods of the first set of tubes engaging the second set of tubes when the
4 tubes are linked together.

1 14. The container as defined in claim 11, wherein the plurality of tubes has four
2 sidewalls and four corners defining a rectangular cross section, the plurality of recesses
3 being formed at the corners of the plurality of tubes and the first rods being mounted in
4 the recesses of one of the adjacent tube and engaging the recesses of the other adjacent
5 tubes when the tubes are linked together.

1 15. The container as defined in claim 14, wherein the plurality of tubes being arranged
2 in an alternating pattern; and
3 the plurality of tubes being linked together at the corners so that two adjacent
4 sidewalls of adjacent tubes are substantially aligned.

1 16. The container as defined in claim 15, wherein the plurality of tubes is arranged in
2 the alternating pattern such that the placement of a four-tube array linked at the corners of
3 the tubes creates a developed cell.

1 17. The container as defined in claim 15, wherein the plurality of tubes includes a
2 plurality of flat bearing surfaces at the corners of the tubes, the plurality of flat bearing
3 surfaces of the adjacent tubes engaging each other when the tubes are linked together.

1 18. A container for storing spent nuclear fuel, the container comprising:
2 a plurality of tubes that receives spent nuclear fuel assemblies, the tubes having a
3 plurality of recesses and being adjacent to each other; and
4 a plurality of first rods being mounted in the plurality of recesses of the tubes;
5 wherein the plurality of first rods mounted in the recesses of the adjacent tubes is
6 attached to each other linking the tubes together.

1 19. The container as defined in claim 18, wherein each of the first rods has an opening
2 and the plurality of first rods is attached to each other by way of axially aligning the first
3 rods of the adjacent tubes so that one or more pins extend through the openings of the
4 plurality of first rods.

1 20. The container as defined in claim 19, wherein the one or more pins comprise a
2 head portion and a body portion, the body portion extending through the openings of the
3 aligned first rods of adjacent tubes and the head portion being adjacent to one of the
4 plurality of first rods.

1 21. The container as defined in claim 19, wherein the one or more pins are welded to
2 or otherwise captured by one of the first rods of the adjacent tubes.

1 22. The container as defined in claim 18, wherein the plurality of tubes has four
2 sidewalls and four corners defining a rectangular cross section, the plurality of recesses
3 being formed along one or more corners of the plurality of tubes and the plurality of first
4 rods being mounted in the plurality of recesses along one or more corners of the plurality
5 of tubes.

1 23. The container as defined in claim 22, wherein the plurality of tubes is arranged in
2 an alternating pattern and the plurality of tubes is linked together at the corners so that
3 two adjacent sidewalls of adjacent tubes are substantially aligned.

1 24. The container as defined in claim 18, further comprising one or more second rods
2 being mounted in the recesses of the plurality of tubes, the second rod mounted to one of
3 the adjacent tubes engaging the recesses of the other adjacent tube when the tubes are
4 linked together.

1 25. The container as defined in claim 24, wherein one set of tubes is mounted with the
2 second rods and another set of tubes is not mounted with the second rods, the second rods
3 of the first set of tubes engaging the second set of tubes when the tubes are linked
4 together.

1 26. The container as defined in claim 23, wherein the plurality of tubes is arranged in
2 the alternating pattern such that the placement of a four-tube array linked at the corners of
3 the tubes creates a developed cell.

1 27. The container as defined in claim 22, wherein the plurality of tubes includes a
2 plurality of flat bearing surfaces at the corners of the tubes, the plurality of flat bearing
3 surfaces of the adjacent tubes engaging each other when the tubes are linked together.

1 28. A container for storing or transporting spent nuclear fuel, the container
2 comprising:

3 a plurality of elongated tubes that receives spent nuclear fuel rods, each tube
4 having four sidewalls and four corners defining a rectangular cross section, the plurality
5 of tubes being arranged in an alternating pattern, the tubes having a plurality of recesses
6 and a plurality of flat bearing surfaces along at least one corner of the tubes; and

7 a plurality of first rods being mounted in the plurality of recesses at one or more
8 corners of the plurality of tubes, the plurality of first rods mounted on the adjacent tubes
9 being attached to the each other linking the tubes together, and

10 wherein the plurality of the tubes is linked at the corners such that the plurality of
11 flat bearing surfaces of the adjacent tubes engages each other and two or more adjacent
12 sidewalls of the adjacent tubes are substantially aligned.

1 29. The container as defined in claim 28, wherein each of the first rods having an
2 opening, the plurality of first rods of the adjacent tubes being aligned so that one or more
3 pins extend through the openings of the plurality of first rods attaching the first rods
4 together.

1 30. The container as defined in claim 29, wherein the one or more pins comprise a
2 head portion and a body portion, the body portion extending through the openings of the
3 aligned first rods of adjacent tubes and the head portion being adjacent to one of the
4 plurality of first rods.

1 31. The container as defined in claim 28, further comprising one or more second rods
2 being mounted in the plurality of recesses of one of the adjacent tubes and engaging the
3 plurality of recesses of the other adjacent tube when the tubes are linked together.

1 32. The container as defined in claim 31, wherein one set of tubes is mounted with the
2 second rods and another set of tubes is not mounted with the second rods, the second rods

3 of the first set of tubes engaging the second set of tubes when the tubes are linked
4 together.

1 33. The container as defined in claim 28, wherein the plurality of tubes is arranged in
2 the alternating pattern such that the placement of a four-tube array linked at the corners of
3 the tubes creates a developed cell.

1 34. The container as defined in claim 29, wherein the one or more pins are welded to
2 or otherwise captured by one of the first rods of the adjacent tubes.

1 35. An attachment mechanism for a tube assembly that stores or transports spent
2 nuclear fuel, the attachment mechanism comprising:
3 a plurality of first rods being mounted on a plurality of tubes; said first rods
4 having openings; and
5 one or more pins;
6 wherein the plurality of first rods is aligned so that the one or more pins extend
7 through the openings of the plurality of first rods.

1 36. The attachment mechanism as defined in claim 35, wherein the plurality of first
2 rods is mounted along one or more corners of the plurality of tubes.

1 37. The attachment mechanism as defined in claim 36, wherein the plurality of first
2 rods is mounted in one or more recesses formed along the corners of the plurality of
3 tubes.

1 38. The attachment mechanism as defined in claim 35, wherein the one or more pins
2 further comprise a head portion and a body portion; the body portion extending through
3 the openings of the aligned first rods of adjacent tubes and the head portion being
4 adjacent to one of the plurality of first rods.

1 39. The attachment mechanism as defined in claim 35, wherein the one or more pins
2 are welded to or otherwise captured by the recess or the first rods of one of the adjacent
3 tubes.

1 40. A method of making a container for storing or transporting spent nuclear fuel, the
2 method comprising the steps of:

3 forming one or more recesses on a plurality of tubes;
4 mounting a plurality of first rods in the recesses of the plurality of tubes;
5 placing the plurality of tubes adjacent to each other;
6 aligning the plurality of first rods; and
7 inserting one or more pins through the aligned openings of the plurality of first
8 rods to link the plurality of tubes.

1 41. The method as defined in claim 40, further comprising welding or otherwise
2 capturing the one or more pins to one of the adjacent tubes.

1 42. The method as defined in claim 04, wherein forming one or more recesses along
2 one or more corners of the plurality of tubes or on the sidewalls of the plurality of tube.

1 43. The method as defined in claim 40, wherein placing the plurality of tubes adjacent
2 to each other comprises aligning the sidewalls of the plurality of tubes in a substantially
3 straight line.

1 44. The method as defined in claim 40, further comprising mounting one or more
2 second rods in the recesses of the plurality of tubes.

1 45. The method as defined in claim 44, wherein mounting the one or more second
2 rods on the plurality of tubes comprises mounting second rods to one set of tubes and
3 mounting no second rods to another set of tubes.

1 46. The method as defined in claim 40, wherein placing the plurality of tubes adjacent
2 to each other further comprising placing four tubes in an alternating pattern to create a
3 fifth tube cell.

1 47. The method as defined in claim 40, further comprising forming a plurality of flat
2 bearing surfaces at the corners of the tubes and engaging the flat bearing surfaces of the
3 adjacent tubes adjacent to each other when the tubes are linked together.